

REMARKS

Reconsideration and allowance of the subject application are respectfully requested. By this Amendment, Applicant has added canceled claim 7 and added new claims 10-15. Thus, claims 1-15 are now pending in the application. Applicant respectfully submits that the pending claims define patentable subject matter.

Claims 1, 2, 3, 4, 5, 6 and 7 are rejected under 35 U.S.C. § 102(b) as being anticipated by Masuda et al. (Ultra-wideband hybrid amplifier comprising distributed Raman amplifier and erbium-doped fibre amplifier”, Electronics Letters, June 25, 1998, Vol. 34, No. 13; hereafter “Masuda”).¹ Claims 8 and 9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Masuda in view of Islam et al. (U.S. Patent No. 6,646,788; hereafter “Islam”). Applicant respectfully traverses the prior art rejections.

The present invention, as recited in independent claim 1, is directed to an optical transmission system (10) that comprises at least one transmitter (12), at least one transmission line (14), at least one optical fiber amplifier (18), and at least one receiver (21). The optical fiber amplifier (18) is designed to show a flat characteristic of output power versus wavelength. The transmission system further comprises at least one coupler (28 or 36) for coupling at least one Raman amplifier (30) to the optical transmission system (10). The Raman amplifier (30) comprises a plurality of Raman pumps and has a Raman gain that is tilted in a direction opposite to a tilt of the optical fiber amplifier that would occur in response to a flat characteristic of a

¹ The Masuda article was cited as a category “X” reference in the June 5, 2003 European Search Report in corresponding European Patent Application No. 03360007.

second input power level versus wavelength such that the opposite tilt directions of the Raman amplifier and the optical fiber amplifier compensate each other and a noise figure characteristic achieved with the Raman gain rises with increasing wavelengths.

Masuda discloses a wideband fiber amplifier including a Raman amplifier section pumped with dual wavelengths and an erbium-doped fiber amplifier section. As shown in Fig. 1 of Masuda, the Raman amplifier section includes a 50 km dispersion-shifted fiber, a circulator, and a Raman pump module including a high-power light source, a laser diode, and a wavelength selective coupler. The an erbium-doped fiber amplifier section includes a wavelength selective coupler, a pump light source, an erbium-doped fluoride fiber and an isolator.

However, Masuda does not disclose opposite tilt behavior in the Raman amplifier and the fiber amplifier and that these tilts should compensate each other, as claimed. Nor does Masuda teach or suggest a rising noise figure over wavelengths as claimed.

With regard to claim 9 (which has been rewritten in independent form), the Examiner concedes that Masuda does not disclose the claimed subject matter. In view of this deficiency, the Examiner cites Islam for disclosing the use of multiple pumping wavelengths in a Raman amplifier. However, neither Masuda nor Islam discloses a “Raman amplifier compris[ing] three Raman pumps and each of the Raman pumps emits a power with a spectrum having a maximum in wavelength range of 1400 nm to 1520 nm, each maximum referring to a different wavelength, the emitted power allocated to a spectrum with a maximum at a shorter wavelength exceeding the emitted power allocated to a spectrum with a maximum at a longer wavelength”, as required

AMENDMENT UNDER 37 C.F.R. § 1.111
Application No. 10/752,677

by claim 9. Nor Islam does provide the requisite motivation for modifying Masuda to these features of the claimed invention.

Accordingly, Applicant respectfully submits that claims 1-6, 8 and 9 should be allowable because Masuda, alone or in combination with Islam, does teach or suggest all of the features of the claims.

By this Amendment, Applicant has added new claim 10-15. Applicant submits that independent claim 10 should be allowable for the same reasons as claims 1 and 9 since it recites a combination of the patentable features of these claims.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



Christopher R. Lipp
Registration No. 41,157

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

23373

CUSTOMER NUMBER

Date: October 27, 2005